Procurement Criteria to Minimize Hand-Arm Vibration Risk

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Good Afternoon. I'm pleased to be here today to speak on an exciting project I am leading for the Defense Safety Oversight Council (DSOC).

The overall goal of this project is to identify criteria and procurement guidelines for anti-vibration gloves and power hand tools which will eliminate or at least reduce workplace hand-arm vibration injuries.

Why did we start this project? A few years ago, Puget Sound Naval Shipyard tried unsuccessfully to order anti-vibration gloves and tools because of severe injuries they were seeing in the dismantling of nuclear submarines. At that time, the GSA manager for power hand tool procurement stated that GSA did not have anti-vibration criteria for selection of power hand tools and that the gloves classified as "anti-vibration products" do not meet relevant ANSI/ISO criteria. It was also noted that GSA could only issue new product criteria if it was requested by the customer. So that is why we started this project – to speak up collectively as customers and provide quality guidance so that people ordering equipment can get safe, high quality products at competitive pricing. Once we get this project completed successfully, we believe there are opportunities for other types of occupational safety and health equipment that need similar guidance developed.

Outline

- Project objectives
- Anti-vibration gloves
- Power tools
- Challenges
- Relevance to future projects

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In this short block of time I will cover the objectives for this project, talk about how the team is approaching the criteria and procurement guidelines for anti-vibration gloves and power tools, and the challenges for the services, DLA and GSA and how information learned during this project may be applied to other efforts

Project Team

- Army
- Navy
- U.S. Coast Guard
- Air Force
- Defense Logistics Agency
- Government Services Administration
- National Institute for Occupational Safety and Health
- Contract Support

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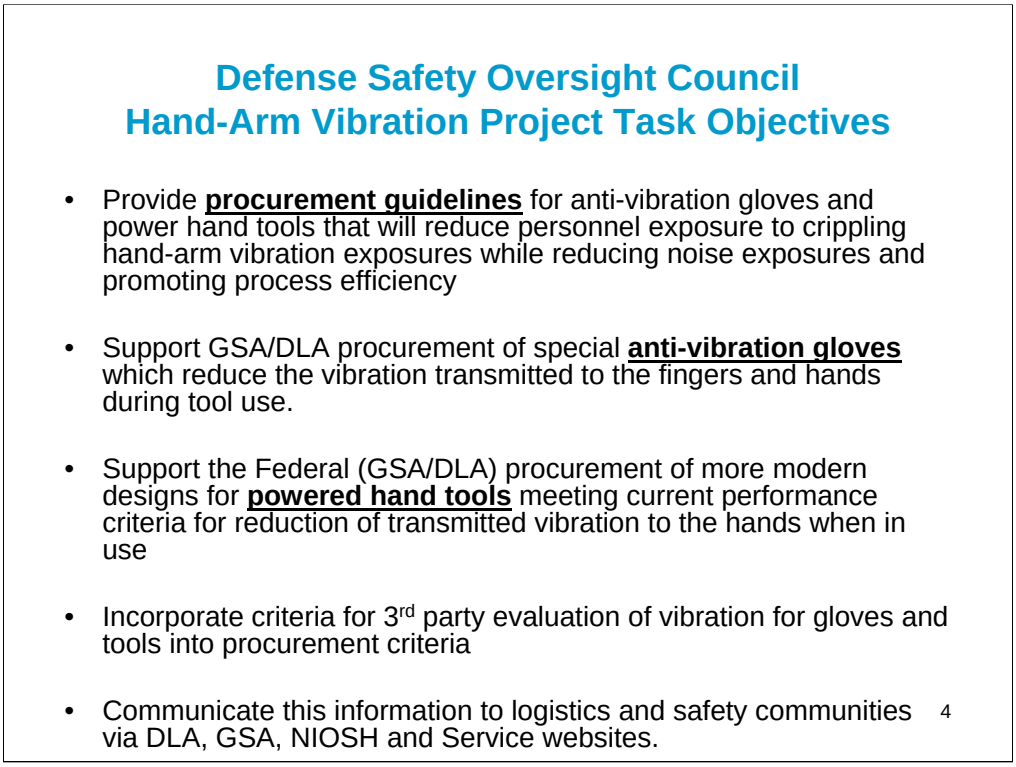
The project team met at NIOSH's Morgantown West Virginia facility in February 2008 with representatives from all the Services, US Coast Guard, DLA, GSA, NIOSH and contract vibration and logistics experts.



The objectives of this project are:

1. **Provide procurement guidelines for anti-vibration gloves and power hand tools that will reduce personnel exposure to HAV exposures while reducing noise exposures and promoting process efficiency.**

2-3.Support GSA/DLA procurement of the AV gloves and power tools that meet the recommended ANSI criteria and

4. Incorporate criteria for third party evaluation of vibration for gloves and tools into procurement criteria.

5. **Communicate safety and procurement information to logistics and safety communities via DLA, GSA, and Service websites.**

Vibration Exposure Guidelines

- ACGIH Threshold Limit Values [1984 to present]

  Range 4-12 m/s^2 based on duration and dominant frequency-weighted, rms, component acceleration

- ANSI S2.70-2006

  Daily 8-hr Exposure Action Value (DEAV) 2.5 m/s^2

  Daily 8-hr Exposure Limit Value (DELV)5.0m/s^2

  Frequency weighted, vector sum measurements

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There are no US regulations for vibration exposure. We do have the ACGIH TLVs for Hand-Arm Vibration which represent conditions under which it is believed that nearly all workers may be exposed repeatedly without progressing beyond Stage 1(mild) of the Stockholm Workshop Classification System for Vibration-Inducted White Finger. [The TLV Table 1 provides values based on time of exposure and range from 4 m/s2 for 4-8 hrs of intermittent or continuous exposure down to less than 1 hour at 12 m/s2 (values of dominant frequency weighted rms component acceleration, which not to be exceeded).]

There are also the Daily Exposure Action Value (2.5 m/s^2) and the Daily Exposure Limit Value (5.0 m/s^2) published in the ANSI S2.70-2006. [The DEAV is defined as the dose of hand-transmitted vibration exposure sufficient to produce abnormal signs, symptoms, and laboratory findings in the vascular, bone or joint, neurological, or muscular systems of the hands and arms in some exposed individuals.] [The DELV definition is the same except exposure above recommended levels is sufficient to cause the findings in a high proportion of exposed individuals.]

For this project, we decided to use the ANSI standard because it is more current and accurate.

With these general guidelines in mind, let's move on to anti-vibration gloves.

Anti-Vibration Gloves (AVG): ISO 10819/ANSI S2.73 Criteria

- Specifies screening test for vibration transmission from a handle to the palm of the gloved hand in the frequency range from 31.5 Hz to 1,250 Hz
- Must fulfill both Transmissibility for Vibration (TR) in Medium (31.5-200 Hz) and High (200-1250 Hz) ranges $TR_M < 1.0$ & $TR_H < 0.6$
- Specifies fingers of the glove must be of the same materials and thickness as the part of the glove covering the palm of the hand (full finger gloves only)

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For anti-vibration gloves ("AVG"), these are the 3 criteria described in the ISO/ANSI standards. There isn't time to go into the details, but the information is here for your later use.

Backup only

The ISO/ANSI standard specifies a method for the laboratory measurement, data analysis and reporting of vibration transmissibility of gloves in the frequency range of 31.5-1,250 Hz.

Gloves must also meet the mean transmissibility for vibration in spectra M & H, where transmissibility is the ratio of the accelerations measured at the surface of the hand and at the reference point. Transmissibility >1 indicate that the glove amplifies the vibration. Values <1 indicate the glove attenuates the vibration.

A glove is considered to be an AVG by the standards if the fingers of the glove have the same properties (materials and thickness) as the part of the glove covering the palm of the hand.

Anti-Vibration Gloves (AVG): The Problem

- Many gloves marketed as AVG do not meet the criteria of ISO 10819/ANSI S2.73
- There are no US regulations for manufacturers to test, certify, and label gloves that meet the ISO/ANSI criteria
- Products currently marketed by GSA as “anti-vibration gloves” do not meet these criteria

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Many glove manufacturers claim to have industrial gloves that protect the hands and wrists from vibration. Some of these gloves are only marginally effective. To address this issue, the International Organization for Standardization developed the ISO 10819 in 1996. In 2002 the American National Standards Institute adopted the ISO standard as ANSI S2.73 [“Mechanical Vibration and Shock-Hand-Arm Vibration-Method for the Measurement and Evaluation of the Vibration Transmissibility of Gloves at the Palm of the Hand”]

In Europe, compliance with the ISO testing and labeling standard is the law. Although there are no similar laws in the US, there is the voluntary ANSI consensus standard.

None of the products currently marketed by GSA as anti-vibration gloves meet these criteria. We believe this project will solve this problem.

AVG: The Approach

- Develop procurement criteria consistent with anti-vibration standard and incorporate into GSA procurement (Completed at NIOSH meeting 2-08)
  - Evaluate compliance with ANSI S2.73 for all gloves intended for use where vibration is a hazard
  - Develop estimates of glove use from current glove National Stock Numbers (completed 5-08)
- Develop a plan to address the need for AVG and ways to procure only ANSI S2.73 compliant gloves

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Our approach to solving the anti-vibration glove problem contains 5 elements:

1. **Develop procurement criteria consistent with AVG standard and incorporate into GSA procurement, which we did at the NIOSH meeting back in February. The project team has only found 4 manufacturers that have AVG products that are ISO/ANSI compliant. We have the list as a handout today. We also have developed estimates of gloves use from current NSNs.**

2. **The team is looking at ways to address procurement of only ANSI compliant gloves:**

   - By developing GSA policy and procedures

   - <u>Possibly</u> integrating requirements into the Federal Acquisition Regulations (FAR) or Defense FAR

   - Developing and recommending DoD policy guidance

AVG: The Approach (cont)

- The GSA tool division has initiated a project to create a new item description for anti-vibration gloves which will be associated with the stock class for power tools
  - Eliminates confusion associated with placing gloves with other products intended for other uses
- Develop detailed communication and marketing plan
- Crosslink GSA, DLA, NIOSH and Service websites
  - This should provide noise and vibration information to assist tool users and procurement agents in the selection process
  - GSA access is willing to post information vibration issues on website

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3. The GSA Tool Division has initiated a project to create a new item description for AVG which will be associated with the stock class for power tools. This should eliminate confusion associated with placing gloves with other products intended for other uses.

4. Develop a detailed communication and marketing plan-the team is starting on this item.

5. Finally, we plan to compile and crosslink information to GSA, DLA, NIOSH and Service websites. We hope to have preliminary information for posting by August 2008.

Power Tools: The Problem

- ANSI adopted the European Union Directive as ANSI S2.70-2006
- There are no US regulations for manufacturers to test, certify, and label power tools
- Limited prior customer input to GSA/DLA for reduced vibration or noise

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Now we'll take a quick look at the problem of vibration in power tools.

ANSI adopted the European Union Directive as ANSI S2.70-2006.

Backup for bullet 1

The European Union as a regulatory directive [2002/44/EEC, "On the Minimum Health and Safety Requirements Regarding the Exposure of Workers to the Risks Arising from Physical Agents: Vibration"] The directive was adopted by ANSI in 2006 as S2.70 ["Guide to the Measurement and Evaluation of Human Exposure to Vibration Transmitted to the Hand."]. It specifies the recommended method for the measurement, data analysis and evaluation, vibration and health risk assessments, and reporting of hand-transmitted vibration exposure.

Although there are no US regulations to require manufacturers to test, certify and label power tools, there is the voluntary ANSI standard that we believe can leverage improvement in the Federal supply system.

There is very limited customer input/feedback to GSA/DLA for reduced vibration or noise.

Power Tools: The Approach

- Evaluate power hand tools where vibration is a hazard
- Establish procedures for the Qualified Products List (QPL)
- Evaluate possible approaches to facilitate and document labs which can provide testing and evaluation
- Crosslink GSA, DLA and NIOSH websites

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Our approach to solving the power tool problem includes 4 elements:

1. **Evaluate power hand tools where vibration is a hazard. NIOSH has established a website describing noise and vibration levels for about 120 tools. However there are in the range of 3500 tools made by various vendors.**

2. **GSA is looking into procedures for evaluating tools for their Qualified Products List "QPL".**
   - Requirements for 3rd party certification/evaluation to provide data
   - Data measurements (and source) to be listed on updated website
   - NIOSH may provide Q/A and repeat some testing (differences to be reported)

3. **NIOSH, with GSA and working group assistance, is looking at ways to identify labs that can provide testing and evaluation consistent with ISO/ANSI standards. They:**
   - **Will prioritize further testing to focus on tools identified by working group**
   - **Identify tools of concern to you, and if available, provide vibration-noise data**

3. **Once information is available, we will crosslink information for tools in a similar fashion to the cross linking for anti-vibration gloves.**

Power Tool Selection Criteria and Request For Vendors Information

- 3rd party report of transmitted vibration
  - Measured in accordance with ANSI 2.70 and NIOSH guidelines under standard, specified conditions
- Air blow off directed away from hands
- Consider warning labels as needed re: noise and vibration

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The project team developed this power tool selection criteria and Request For Vendors Information. [Mark: Just address the main bullets]

Challenges

- Educating safety professionals and industrial hygienists to understand and engage in existing processes for feedback and glove and tool improvement
- Educating safety and industrial hygiene managers to understand the importance of improving worker gloves and tools as opposed to traditional surveys and reports
- Streamlining and clarifying current processes and policies
  - Establishing new policies and procedures, if needed

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While the team is off to a good start, we definitely have some challenges, like:

- **Educating safety professionals and industrial hygienists to understand and engage in existing processes for feedback for glove and tool improvement**

- **Educating safety and industrial hygiene managers to understand the importance of reaching out and solving problems like improving worker gloves and tools as opposed to traditional surveys and reports.**

- **Streamlining and clarifying current processes and policies**

Challenges (cont.)

- Incorporating risk management in glove and tool selection
  - Involves identifying and communicating with responsible technical authorities and program offices
- Communication

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• Incorporating risk management into glove and tool selection and use processes, to include:

- **Making appropriate tools and gloves available**
- **Incorporating their use in systems sustainment**
- **Developing supporting policy and guidance as needed**

• And finally Communication!! We need to communicate with process owners, system commands, acquisition program management, logistic and safety and health communities. Easy access to information on GSA, DLA, NIOSH and Service websites will be critical. We will only be successful if the ordering process is easy and the AVG and power tools purchased meet their respective ANSI standards and are available at competitive prices.

Relevance to Future Projects

- **Recent case studies where safety and health intervention improved "neglected" products**
  - Aviation support (flight deck) cranial
  - Combat arms earplug
  - Shipboard fall protection harness
  - Current "anti-vibration" gloves
  - Army "soldier systems" focus on process management and coordination of efforts to outfit soldiers

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After this project is completed successfully, we hope some of you are interested in submitting similar projects.

[Address below only if time permits]

Recent case studies where safety and health intervention improved "neglected" products

Aviation support (flight deck) cranial

This 1950s product provide far less hearing attenuation than required by modern aviation support (perhaps 20 dB attenuation versus 150 dB aircraft). It also lacks impact resistance consistent with ANSI standard, did not effectively accommodat night vision goggles and was expensive and time consuming to maintain.

A suite of new products is being introduced beginning in FY 2010. Interim measures include custom molded earplugs an improved seals for existing equipment.

Combat arms earplug (developed to fill dual needs for noise attenuation for impulse (explosive-firearms noise) and ability to hear quiet sounds with ability to provide noise protection for steady state exposures)

Shipboard fall protection harness

The manufacture came to our office because the existing product was

- less protective/ consistent with current standards
- reported by users to be less comfortable
- AND more expensive than their COTS alternative

THE NAVY WAS THE ONLY ORGANIZATION BUYING THIS OUTDATED ITEM OF EQUIPMENT AND IT LACKED A TECHNICAL OWNER!

Current "anti-vibration" gloves

Army "soldier systems" focus on process management and coordination of efforts to outfit soldiers. Prior to this soldiers were loaded down with multiple items of equipment that could total 80 of their body weight and also had helmet mounted equipment tha imposed excessive, unbalanced loads on shoulders and neck.

Resources

- Navy Acquisition Safety Vibration Website:

http://www.safetycenter.navy.mil/acquisition/vibration/default.htm

- NIOSH Vibration Website:

http://www.cdc.gov/niosh/topics/ergonomics/ (scroll down to vibration)

- GSA Advantage Website:

https://www.gsaadvantage.gov/advgsa/advantage/main/start_page.do

- Handout of ANSI compliant gloves

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Here are 3 excellent websites for your future use.

The list of ANSI compliant gloves is available at the back table.

I will now entertain brief questions and comments.